12/07/09

**EXTRA INFORMATION**

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND – REGION 1
ONE CONGRESS STREET SUITE 1100
BOSTON MASSACHUSETTS 02114-2023

June 9, 2009

Ms. Maryellen Johns
W.R. Grace – Remedium
63 Whittemore Avenue
Cambridge, MA 02140

Re: Conditional Approval of the Draft Landfill Area Pre-design Results Report, dated April 2009, for the W. R. Grace (Acton Plant) Superfund site, Acton & Concord, Massachusetts

Dear Maryellen,

In accordance with the 2006 Remedial Design/Remedial Action Statement of Work (SOW) for the W. R. Grace (Acton Plant) Superfund site, Grace submitted a *Landfill Area Pre-design Results Report*, dated April 2009, to the United States Environmental Protection Agency (USEPA) and Massachusetts Department of Environmental Protection (MassDEP). Subsequently on May 15, 2009, WR Grace submitted Section 4 "Landfill Area Groundwater Modeling."

The following are EPA and MassDEP comments on our review of this entire report. These comments also considered and incorporated various concerns from MassDEP, the Town of Acton, the Acton Water District and Acton Citizens for Environmental Safety. Copies of their original comments have been attached for your reference.

**General Comment Regarding Capture Zones and the Need for Additional Data Collection**

The Landfill Area Pre-design Results Report maintains, based on model-predicted capture zones, that capture zones consistent with the ROD objectives are attained by the extraction system as it is currently being operated. However, the observed pumping rates for the newly installed wells are significantly lower than had been estimated during the Feasibility Study; the model significantly over-predicts drawdowns for certain monitoring wells; and a sensitivity analysis of model parameters has not been performed for the most recent model updates. These observations, as well as other questions and comments that have been identified regarding the model (presented below), suggest that relying solely on the model is not advisable for establishing whether capture is adequate.

In a conference call held on June 1, 2009 with W.R. Grace ("Grace") and GeoTrans, these concerns were raised by EPA, MassDEP and our consultants, and Grace and GeoTrans agreed that the following would be done:

- Collect additional round(s) of water level data this summer (in monitoring wells used for the pumping test - at a minimum those listed in Table 3-2 of the report).

- Use the data to generate potentiometric surfaces and estimate capture zones for overburden and bedrock

- Use these data, rather than the model-predicted capture zones, to determine if additional extraction wells may be needed in order to obtain the ROD specified capture zone.

- Base treatment system design on a flow rate that can accommodate the existing pumping rates plus an additional safety factor to allow for additional extraction wells to be added, should this be proved to be necessary.

In order for Grace to demonstrate that the groundwater quality outside the capture zone is clean/relatively clean, it may be necessary to obtain groundwater quality data from additional wells that are not part of the annual groundwater monitoring program. The annual groundwater monitoring program only includes select wells and there are many other wells that are not monitored on a regular basis. EPA and MassDEP reserve the right to require additional groundwater quality data to be obtained, should it become necessary.

Also, if it turns out that the existing network of monitoring wells is not adequately situated or otherwise has a gap preventing a determination from being made about groundwater quality outside the capture zone, then additional groundwater monitoring wells may need to be installed. EPA and MassDEP reserve the right to require additional monitoring wells to be installed, should it become necessary.

We also discussed that installing additional extraction well(s) may be found to be necessary in the future based on water level measurement and contaminant monitoring data. EPA and MassDEP request that when the potentiometric maps are being prepared and captures zones are being estimated (second bullet above), consideration be given to depict how vertical potentiometric differences in the landfill area affect the groundwater flow regime (such as by preparing separate shallow and deep overburden potentiometric maps or by preparing hydrogeologic cross sections in critical areas).

EPA and MasDEP are providing Grace with a conditional approval of the Landfill Area Pre-Design Results Report, with the conditions that this additional data collection be performed, and that additional (both model and non-model related) specific comments on the report be addressed. Specific comments are presented below. A section on model (Section 4) related comments is also included however these comments do not need to be addressed at this time (because additional data collection rather than the model will be used to determine the actual capture zones) but are provided for the record, and are included below.

**Specific Comments on Sections 1 through 4**

1. Page 2-2, Section 2.3 Extraction System Reconfiguration, second paragraph. According to information presented in the Initial Site Characterization Report (HSI GeoTrans, August 1998), the original yields of MLF and WLF were both about 33-34 gpm. While the yield of MLF following redevelopment was about the same, the yield of WLF (9-10 gpm) was considerably lower. Please provide information regarding the yield or specific capacity of WLF before redevelopment; if additional redevelopment is needed in the future, the results of this relatively unaggressive redevelopment program will be useful for planning future activities.

2. Page 4-7, Section 4.2 Landfill Area Capture Zone Evaluation, second paragraph. The particle tracking shown on Figures 4-7 through 4-10, while useful for envisioning the groundwater movement in the capture zone, would be complemented by figures showing the capture zones of the individual extraction wells in each model layer. Figures 3-2 through 3-6, in Appendix A of the Public Review Draft Remedial Investigation Report

(GeoTrans, July 2005), are an example of the type of presentation that would be useful in understanding the flow dynamics. Please provide figures that show the individual extraction well capture zones in each layer, using figures similar to those presented in the RI report. The groundwater contour maps should include arrows and dashed lines depicting groundwater flow directions and extent of the capture zone. The maps should depict the ROD-required capture zone and the benzene and arsenic plumes, so that a simple comparison can be made between the current capture zone, the contamination mass, and the ROD-required capture zone.

3. Possible cross-flow in SWLF-1: The report indicates extraction well SWLF-1 is screened across 11 feet of the overburden, as well as 43 feet of open bedrock. Grace should clarify if any precautions are being made to assure that cross-flow is not occurring when the pump is not in operation. Along these same lines, Grace should clarify if the pump in SWLF operates continuously or cycles on and off (i.e., potentially allowing cross-flow to occur).

**Additional Specific Comments Regarding Section 4 – Landfill Area Groundwater Modeling**

The following comments and questions on Section 4 are provided to identify questions regarding the modeling and its ability to accurately predict the overburden and bedrock capture zones that will be created by the extraction wells as currently configured. Based on the conference call held on June 1, 2009 with Grace and GeoTrans, it has been agreed that additional water level measurements will be performed in the Landfill Area and used to estimate the extents of the capture zones as they exist after months of pumping, and that these measurements will be used as a basis to determine if additional extraction wells may need to be installed to meet the ROD objectives. It was agreed that additional data collection, rather than additional effort to attempt to improve the model's predictive capacity in the Landfill Area, would be more conclusive in demonstrating the extents of the capture zones. The comments below are offered in the event that additional use of the model is proposed by Grace in lieu of additional data collection for the purpose of establishing capture zones or other purposes. These comments do not need to be addressed by additional modeling efforts at this time since it has been determined that the model alone will not be used as the sole basis for demonstrating appropriate capture. If/when Grace begins to utilize the model as a decision-making tool, EPA and/or MassDEP may require these model-related comments to be addressed.

1. Page 4-2, Section 4.1 Post October 2008 Modifications to the Groundwater Flow and Contaminant Transport Model. No sensitivity analysis on the changes to the hydraulic conductivity zonation in the landfill was done. Please do a sensitivity analysis or discuss why it is not necessary in this case.

2. Page 4-3, Section 4.1.1 Ten-Day Constant Rate Pumping Test, top partial paragraph. The specific storage value of 0.01 used in the model for unconsolidated deposits seems quite low - please discuss whether the aquifer is considered confined, semi-confined, or unconfined at the three overburden extraction wells. Even though the storage values are not relevant to the steady state simulations (as stated in the June 1 conference call), they are relevant since they were used, in concert with hydraulic conductivity values, to adjust the model for a better match with the pumping test results. Please provide additional discussion of the methodology used to adjust model hydraulic conductivities to match pumping test results.

3. Page 4-3, Section 4.1.1 Ten-Day Constant Rate Pumping Test, first full paragraph. The model-calculated drawdowns after 10 days of simulated pumping are larger than the actual measured drawdowns in numerous wells at the landfill and smaller at several wells south of the landfill. A

cursory review of the data suggests that at locations where the simulated drawdowns are greater, the monitoring wells are screened in the upper part of the unconsolidated aquifer. Since the extraction wells are deeper in the unconsolidated aquifer, the actual vertical variations in drawdown may be greater than those predicted by the model. Please comment on the significance of the differences between actual and simulated drawdowns.

4. Page 4-7, Section 4.2 Landfill Area Capture Zone Evaluation, second paragraph. The particle tracks for overburden model layers 2 and 3, shown on Figures 4-7 and 4-8, indicate that groundwater between monitoring wells B-08 and LF-15 is moving southwest to be captured by MLF. The depiction of the benzene plume on Figure 4-16 suggests that the plume is moving southeast, toward LF-06 and SELF-1. Please discuss the apparent difference between model-predicted and apparent actual groundwater flow directions in this critical part of the capture zone.

5. Page 4-7, Section 4.2 Landfill Area Capture Zone Evaluation, second paragraph. The particle tracks for overburden model layers 2 and 3, shown on Figures 4-7 and 4-8, indicate that no groundwater is flowing to extraction well WLF. Particles seem to bypass WLF and flow to SWLF-1. Please discuss this apparent anomaly.

**Specific Comments on Section 5 – Treatability and Toxicity Testing**

1. Page 5-3, Section 5.1.1 Testing Procedures, first full paragraph. This paragraph discusses the anomalous result for lead in the effluent sample (the result reported on Table 5-3), and notes that analyses of effluent performed by Siemens did show detectable lead. Please clarify how the lead results reported in Table 5-3 were analyzed; did Siemens generate effluent and have the samples sent to an outside laboratory identified by GeoTrans, while also analyzing some samples internally? Perhaps there is some relationship between the use of different methods/laboratories and the anomalous lead results. It is agreed that the lead detected in the one effluent sample is anomalous (as lead concentrations should not be increased by treatment) and that lead is not likely a concern for discharge of treated effluent to Sinking Pond, but the text as presented is not clear on who performed analyses on what samples. It is also interesting to note that the results presented in Table 5-3 show a higher reported concentration for dissolved lead than for total lead in the treated effluent sample. This is also anomalous and may indicate some problem at the laboratory or with the sampling equipment causing trace lead contamination.

2. Attachment D, Treatability Test Report – Page 12 Regarding Odor. This section notes that odor was "reduced" (not eliminated) during treatment. No mention of odor is included in Section 5.0 however. Please indicate whether odor is expected to be a concern at full scale and whether additional treatability testing might be necessary to evaluate alternative means of odor control. The question of odor control will need to be addressed in the next submittal (the Concept Design). The jar tests were designed to optimize metals removal, as is appropriate since metals removal is the primary purpose of the chemical precipitation treatment. However, odor control is a secondary objective of the treatment and bench testing to establish treatment conditions that can eliminate odor may be warranted prior to advancing to the Concept Design stage. If permanganate treatment alone is not able to eliminate odor, it is possible that some other technology will be needed.

3. Metals flocculation: Toxicity testing results indicate that treated groundwater has no chemical toxicity and, therefore, would not pose a risk of harm to ecological receptors that are exposed to it. However, it isn't clear if the redox potential of the treated

groundwater was evaluated. Historically, the discharge of groundwater into Sinking Pond has resulted in significant metals precipitation. MassDEP is concerned about a potential increase in metals flocculation, to a point where a condition of "readily apparent harm" to ecological receptors could be triggered. Grace should evaluate the potential for additional metals flocculation.

4. Arsenic discharge limit evaluation: Page 5-4 of the report indicates that the final arsenic discharge limit will not be established until after the treatment system has been running and optimized for approximately two years. Please clarify why it will take two years of operation to complete this evaluation.

If you have any questions, you may contact me at 617-918-1448.

Sincerely,

Derrick Golden
Remedial Project Manager
Office of Remediation and Restoration
Environmental Protection Agency

cc: Bob Cianciarulo – EPA
Gretchen Muench - EPA
Jennifer McWeeney – MassDEP
Barbara Weir – Metcalf & Eddy
Chris Allen – AWD
Jane Ceraso – AWD
Doug Halley – Acton Board of Health
Mary Michcleman - ACES
File – EPA